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## ELECTRIC POWER AND POWER EQUIPMENT

### EQUIPMENT FOR NUCLEAR POWER STATIONS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 3 Nov 79 p 2

[Article by Yu. Sobolev, chief engineer of the "Izhorskiy Zavod" Association imeni A.A. Zhdanov, Leningrad: "The Direction for the Search"]

[Text] Scientific and engineering progress is inseparably tied to the rapid development of nuclear power engineering. For a clear illustration, we shall compare two figures: one kilogram and 2,500 tons. The first is the amount of uranium, which when fissioned, liberates the same amount of energy as when the enormous mass of the highest quality hard coal is burned.

The resolutions of the 25th CPSU Congress in the 10th Five-Year Plan called for the construction of AES's [nuclear electric power station] with an overall capacity of 13 to 15 million kilowatts. The collective of the "Izhorskiy Zavod" imeni A.A. Zhdanov is participating in the execution of this program.

The association is faced with the following assignment: sharply increase the production of equipment for nuclear power stations. Another route was also planned: increase the per unit capacity of the reactors, turbines and generators to assure the requisite level of the power capacities at nuclear power stations.

The Izhorskiy workers have completed the delivery of the main equipment for the fourth power unit of the Leningrad AES imeni V.I. Lenin. When it is started, the station at Sosnovyy Bor will achieve a rated power of four million kilowatts. The power units with a capacity of one million kilowatts will soon be in service at the Novovoronezhskaya and Yuzhno-Ukrainskaya station. The association has set about the fabrication of the equipment for the Ignalinskaya AES, where the largest reactor having a unit capacity of 1.5 million kilowatts will go on-line in the 11th Five-Year Plan.

The production of the main power equipment for AES's was started 15 years ago in the association. The unique combination of a metallurgical and a

metal machining industry in one enterprise, and the high skill levels of the workers and specialists have become the basis for the progress which has been achieved in a short period of time. A transition has been made from individual nuclear unit assemblies of 210,000 kilowatts to the complete package fabrication of equipment for power units of one million kilowatts.

It was necessary to solve a multiplicity of engineering problems for this. Nuclear power engineering places special demands on the operational reliability and service life of the equipment. To solve this problem, it was first of all necessary to reconfigure the metallurgical production.

Special electrometallurgy is a completely new industrial sector. Its appearance on the scene and intensive development is a brilliant example of the effectiveness of cooperation between workers, factory specialists and scientists. The efforts of 40 enterprises and scientific research organizations were combined in the design of the "million kilowatter". The Leningrad oblast committee of the CPSU approved and supported the initiative.

New types of high strength framing steel were created by the participants in the cooperation. Then they were faced with learning to fabricate ultra-large ingots from this metal: the reinforcement of the AES units required increasing the weight of the major assemblies, which determine the capacity of the station. It was not simple to find the most reliable method of quality control of the fabrication of large blanks.

The largest vacuum arc and electric slag furnaces in the nation are now in operation in the association. Through joint efforts, a vacuum and refining installation external to the furnace has been built through combined efforts. It makes it possible to obtain an ingot with a weight of up to 450 tons, and assures the homogeneity of the chemical composition and mechanical properties of the steel. Thus, speaking metaphorically, a step has been taken beyond the horizon. For such ingots are necessary to manufacture the rotors for turbogenerators with a capacity of two million kilowatts.

Many new things have also appeared in welding production. Here, we were assisted by the scientists of the Electrical Welding Institute imeni Ye.O. Paton, the Central Scientific Research Institute for Heavy Machinery, Leningrad Polytechnical Institute imeni M.I. Kalinin and other scientific organizations. For example, an ingot of several hundred tons was required for the fabrication of the rotor of the power unit of the Yuzhno-Ukrainskaya AES. But the base for the manufacture of monolithic forgings of such dimensions is still just being designed. What to do? The scientists proposed a courageous solution: consolidate three ingots into one, using electric slag technology. Thus, the problem of welded-forged rotors for power units with a capacity of one million kilowatts was solved for the first time. The unique feature of the operation consists in the fact that

it was necessary to weld blanks with a cross-section of two by three meters!

The introduction of the new technological solutions considerably raised the mechanization level of the welding operations. On the main products, it reaches 80 to 85 percent now. And simultaneously, it serves as a guarantee of high quality joints. The operational reliability of the entire power unit and the entire station depends on this. But how, shall we say, is the quality of a welded seam 600 millimeters thick to be checked? Through the scientists, the Izhorskij plant obtained a linear electron accelerator, which makes it possible to detect microscopic defects in the metal.

The creative cooperation turned up yet another economic advantage. The consolidation of the capacity of a nuclear power unit did not entail any substantial increase in the dimensions of the equipment. This is of major importance for transporting. For it is far from always possible to ship by water. The asphalt surface of highways will not stand up to the multiple tonnage of giant reactors, while the construction of new bridges and roads requires enormous capital outlays. The most efficient method of transportation is via railroad. And this possibility was taken into account. The "million kilowatter" was inscribed within the overall dimensions of a railroad bed, and rail bridges and tunnels.

Atomic reactors of this power have now been put in series production. And the search continues. A high return can be expected from matching up the capacities of the main equipment of nuclear power units. In the new stations, the "million kilowatter" Izhorsk reactors will operate in a monoblock with turbines and turbogenerators of the same capacity. Thus, the amount of equipment will be curtailed and capital and operational outlays will be substantially reduced.

Another problem is also being solved in cooperation with the collectives of the "Leningrad Metal Plant" and "Elektrosila" production associations: the design of high speed turbines and turbogenerators for power units with a capacity of a million kilowatts. The economic impact of this development is also figured in millions of rubles.

The role of the peaceful atom in strengthening the nation's power engineering is constantly increasing. Even in the present five-year plan, nuclear electric power stations have saved the national economy tens of millions of tons of organic fuel. AES's have a great future.

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## ELECTRIC POWER AND POWER EQUIPMENT

### ATOMMASH CONSTRUCTION PROBLEMS CITED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 19 Oct 79 p 2

[Article by I. Mordvintsev, Volgodonsk: "The Operational Manager: His Role and Responsibility. In the Position of a Queen which Does not Attack"]

[Text] Some three quarters of the present year have not been sufficient for placing the first stage of the Atommash Plant in service: work left unfinished by the builders and installation workers has put off the start. I recall, at one of the January planning sessions - it was then managed by the responsible official of the Rostov oblast committee of the CPSU - the eye was caught by the effort of many of its participants, in the first place, to shield themselves, and secondly, to do this so that they did not assault anyone. Just as in the well known chess problem where an entire detachment of queens is to be arranged so as not to capture each other. The thought occurred to me: with these methods, the construction project threatens never to finish. The position "don't touch me, and I won't touch you" permits a lack of responsibility, and the replacement of genuine business interrelationships with empty promises. But the construction project is not just harmless philosophizing over a chess board. Here a drawn game cannot help anyone.

Unfortunately, such a result is not a rarity. Here is one of the examples. At the Janyary meeting of the staff, the manager of the Rostov "Yuzhstal'konstruktsiya" Trust, A. Sychev, cheerfully reported, "We are keeping the schedule! All deficiencies will be eliminated within the planned periods."

Within which deadlines? Up to now, it is not a joking matter which has agitated the Atommash representatives. The problem is that the subdivision of the trust cited here installed the wall panels in the building without the requisite seals. And as a result, the climate in the shop does not differ too much from the outside climate. The Atommash workers are not to be envied in feeling the winter winds here!

Most likely, the following was determined for this reason at the above mentioned meeting: let the supervisors of each subdivision seek out the

ways, just as in the first quarter, to deal with the deficiencies. In other words, bypass severe penalties. And what of it? I do not know if Aleksandr Sereyevich received the promised dressing down at the agreed time. But somehow, as early as August, entering the office of the chief engineer of "Volgodonskenergostroy", Ye. Bazhenov, I found Sychev there in a state of extreme irritation. It turned out that the installation of the above mentioned seals could not be made without the solution of a whole series of problems by the designers. And there you have your "precisely by the deadlines"!

It is suspicious that a builder of such considerable skill as early as January could not assess the reality of that which was promised and the fact that there were no bases for it. Does it turn out that in the figuring, they were speaking "on the off chance"? And as a result of such an incorrect "move", the workers and specialists of Atommash exceeded the standard time allotted for the move. For you see, a new winter is on the threshold, while the heating circuit for the main building, as before, has not been finished. And what are the people to do? And then there is the equipment: for nearly machine tool here is a custom made high precision tool, and for this reason, it is designed for operation in an extremely narrow range of temperatures.

I foresee the reply: what does it matter if a few such situations arise, they say - try to keep all promises! But you see, there is simply not another way. In other words, how to coordinate the actions of the construction and installation subdivisions, which now number no less than - and at times even more - 20 personnel at each facility? Consequently, absolutely clearcut and precise information is essential.

To be sure, it seems that there cannot be precise information if it is given by the chief of a subdivision, responsible for the given operation. His word is an invisible, and at the same time, a real component, without which the mutual coupling of the links in the construction conveyor line is impossible.

A clear illustration of the "material nature" of a manager's words is the situation in the brigade of the G. Fomenko, one of the best at the construction site. The first secretary of the Vologodonsk city committee of the CPSU, I. Uchayev, insistently recommended that I become acquainted with the brigade.

"A remarkable collective! Of the 500 brigades we have on the construction project, only every tenth brigade does a million rubles worth annually. And Fomenko's does two and a half million worth!"

Igor' Fedorovich unambiguously gave us to understand that if the others master the experience of the leaders, then the present volumes will be carried out with a significantly smaller number of workers. And in actual fact?

An enormous placard hung the entire past winter in building No. 1 of Atomnash: "The brigade of G. Fomenko is working on the construction of the X-ray chamber using the method of brigade subcontracting. Work was started in July of 1978 and the deadline for the completion of the facility is February of 1979". Knowing the high reputation of the leading collective and its leader, one can hypothesize: it was somehow assured the conditions for meeting the obligations. Nothing of the kind. They happily got the brigade in a mess: they did not supply it with concrete.

"You see," explained the manager of "Volgodonskenergostroy", Yu. Chechin, "Today we have a great shortfall of concrete. The base has lagged behind."

Granted. But really, the outlook for the concrete did not arise overnight. There was no possibility of guaranteeing the brigade its uninterrupted supply - was it not worthwhile to conclude a contract agreement with the brigade. Even if only to not discredit this undertaking in the eyes of the workers. Moreover, the X-ray chamber, about which we are speaking, is not finished even now. And the brigade of G. Fomenko is shifted time and again from one facility to another. And in the final result, its indicators are worse than last year's.

It is worthwhile to also recall the leap frog shuffling of the deadlines which the builders organized in the construction of Atomnash building No. 6. They did not stint in their assurances to the plant workers in the "Volgodonskenergostroy": Don't worry, they say, we will be on time. But based on the totals for three quarters, the considerable lag is being maintained here. The shop for fluxes and welding materials, which is housed in the sixth building, is a necessary link in the production of equipment for the AES. And even January, it was known that: if this facility is not ready this year, the Atomnash workers will have to stand idle. Moreover, in taking refuge behind a curtain of promises, the management of "Volgodonskenergostroy" will clearly intentionally have to also bring it on-line in only a "nominal" manner, i.e., with a long list of deficiencies.

And what about the plant workers? How are they to get the builders to bring the facilities in on time with quality? It is as if they are fighting for this, but somehow shyly and ineffectively, trying to avoid fundamental formulation of the problem. Why? The deputy general director of Atomnash, A. Koval'skiy, explained, "You know, they make the first claim on us: they say, the capacities are needed, and the sequence of the facilities interests us so much that . . ."

"Who makes the claim?"

Koval'skiy named one of the managers of "Volgodonskenergostroy". And then immediately had a second thought: "Print his name in the paper and I will come out with a denial, I will say that I did not say this." And from this man, they are also asking . . .

Here is how great the desire is to "have a little sympathy": my conversational partner was ready for the sake of this to put himself in an extremely embarrassing position. Where did such self-sacrifice suddenly come from? Is it really now a small thing to play the game of "non-attacking queens" and have they started to play give-away now at Atomnash? What has caused this and where will it lead? These are questions which life sets before the local party organs. And they must be answered. Naming all the names.

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## ELECTRIC POWER AND POWER EQUIPMENT

### PROGRESS ON PERMSKAYA OBLAST GRES

Moscow PRAVDA in Russian 18 Nov 79 p 1

[Article by V. Cherepanov, Dobryanka, Permskaya Oblast: "The Largest in Europe"]

[Excerpt] The first unit was recently placed under the foundation of the main building of the largest thermal electric power station in Europe, having a capacity of 4,800,000 kilowatts, at the construction site of the Perm' GRES, under construction in the Urals city of Dobryanka.

Some six power units with a capacity of 800,000 kilowatts each will be housed in the main building, with a length of about 700 and a height of more than 100 meters. We will note that solid fuel plants of this kind have never been used anywhere else. Every 24 hours, the GRES will use several tens of heavily loaded railroad cars of coal. However, not many people will be needed to unload and feed in the enormous amount of fuel. All of the major and auxiliary processes at the station have been maximally mechanized and automated. Electronic computers will find wide applications in the control of the power generation modes. In order to protect the environment, two 320 meter smokestacks with electrostatic filters will reduce emissions of ash into the atmosphere down to a minimum. The station will need 150 cubic meters of water every second. But the industrial drainage will not go back into the Kama, but will be cooled and reused.

The builders have obligated themselves to turn over the first power unit at the end of 1982.

The "Permstroyput" Administration has run the approach railroad branch line, which is to connect the GRES to the Dobryanka Station. The problem of reliable and convenient transportation will become even more severe for the GRES in the future, if the construction of the bridge across the Chusovaya River is not speeded up.

When the power giant on the Kama is brought up to the design capacity, it will be able to generate twice as much electrical power as provided by all of the electric power stations of the Western Urals. This will not only completely satisfy the needs of the enterprises of the Permskaya oblast, but will also permit supplying a considerable portion of the electrical power to other regions of the nation.

## ELECTRIC POWER AND POWER EQUIPMENT

### MINISTER INTERVIEWED ON FIRST MHD FACILITY

Moscow PRAVDA in Russian 1 Oct 79 p 1

[Interview with P.S. Neporozhniy, USSR Minister of Power Engineering and Electrification under rubric by R. Kuznetsova: "Plasma Will Replace the Turbine"]

[Text] The construction of the first industrial magnetohydrodynamic (MHD) power unit with a capacity of 500 megawatts has begun in Ryazan'. The electric power station should generate current in 1985. The development of the structural designs for the station is being handled by the "Energiya" Scientific Production Association of the Ministry of Power Engineering and Electrification of the USSR. The unit will consist of an MHD generator with a capacity of 250 megawatts and a standard steam turbine. The minister of power engineering and electrification of the USSR, P.S. Neporozhniy, talks about this first in the new direction in power engineering.

[Kuznetsova] "Petr Stepanovich, what is the special feature of the new station?"

[Neporozhniy] "The magnetohydrodynamic method is one of the most promising ways of the direct conversion of thermal energy to electrical power. It allows for a marked increase in the economic efficiency of thermal electric power stations. It is figured that the first generation MHD electric power stations will have an efficiency of about 50 percent, while those of the second generation will run up to 60 percent as opposed to the 40 percent at the best thermal power stations. In this case, the specific fuel consumption is reduced by 20-30 percent right in the first stage. Based on the calculations of specialists, the block of the industrial station under construction in Ryazan' will yield a savings in fuel of about 20 percent as compared to the power units operating in the classical thermal configuration. In this case, it will need about half as much water.

And something more about an advantage of it. At MHD stations, it is possible in principle to obtain a power on the order of 1,000 megawatts in

a single unit. That is, it is capable of providing as much energy as two prewar Dneproges's would produce."

[Kuznetsova] "What scientific concepts were employed in the design of the new unit?"

[Neporozhniy] "A potential difference arises in any conductor which moves transverse to a magnetic field, and if the external circuit is closed, an electric current will flow in it."

"Plasma, an ionized, electrically conducting gas, plays the part of the conductor in a magnetohydrodynamic generator. Organic fuel is burned in a special combustion chamber at a temperature of about 3,000 degrees, the combustion products make a transition to the plasma state. So-called additives, potassium or cesium salts promote this. The plasma interacts with a strong transverse magnetic field in the special MHD channel. The electric current produced in this case is picked off from the channel by electrodes, converted to alternating currents, and then fed to into the power system.

The plasma temperature remains rather high, about 2,000 degrees, at the output of the MHD generator. This hot stream will be directed into the steam generator of a conventional thermal station. An additional advantage is derived from this.

Intense research work preceded the design of the industrial power unit, in particular, using the well known Soviet U-02 and U-25 installations, built at the High Temperature Institute of the USSR Academy of Sciences. It was specifically these which made it possible for specialists to solve numerous scientific and engineering problems. The research work on the experimental industrial U-25 installation, which has already been operating for more than 10,000 hours, is continuing."

[Kuznetsova] "And what do MHD electric power stations represent from the viewpoint of protecting the environment?"

[Neporozhniy] "We recall that of the 100 grams of coal, fuel oil or gas burned in the furnaces of thermal power stations, only a fourth goes for the generation of electrical power. This leads to pollution of the environment. The increase in the thermal efficiency of the MHD electric power station is accompanied by a reduction in heat emissions, and this means, also in pollution of the atmosphere.

Moreover, an engineering system for scrubbing the air polluting elements from the combustion products is provided at the MHD electric power station. I will give a specific example. An ionizing additive is used in the installation to increase the electrical conductivity of the plasma. This additive combines well with sulfur. Because of this, the sulfur content of the emissions is reduced down to a minimum. On the whole, the

widescale introduction of this new trend in power engineering will assist in solving environmental problems.

It stands to reason that MHD electric power stations cannot be treated as some kind of panacea for all of the complexities related to the solution of the energy problem. However, the MHD method will occupy a place of honor alongside progressive methods of power generation.

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## ELECTRIC POWER AND POWER EQUIPMENT

### KHMEL'NITSKAYA AES AND POWER LINE CEMA COOPERATION

Kiev PRAVDA UKRAINY in Russian 26 Aug 79 p 3

[Article by A. Kovalkin, Chief Secretary of the Soviet Section of the Permanent Commission of the CEMA on Electric Power: "Socialists Integration in Action: the Khmel'nitskaya AES"]

[Text] The symbols for the new joint construction projects of the CEMA member nations have appeared on the integration map: the Khmel'nitskaya AES and the 750 kilovolt electric power transmission line from the Khmel'nitskaya AES to Zheshuv (Poland). The decision on these construction projects was made at the 23rd session of the Council of Mutual Economic Assistance, which took place in June in Moscow.

The Khmel'nitskaya nuclear electric power station with a capacity of four million kilowatts will be built through the efforts of Hungary, Poland, the Soviet Union and Czechoslovakia. The amount of power which each of the nations will receive from the new nuclear station will be directly proportional to their contribution to its construction.

In accordance with the agreement, our nation will provide the project plan for the construction project, allocate the requisite material and financial resources for the construction of the AES, carry out the construction and installation work and also take on itself the operational concerns of the AES as supplying it with nuclear fuel. The participation of the other partners has also been determined: the VNR [Hungarian People's Republic], the PNR [Polish People's Republic] and CSSR [Czechoslovakian People's Republic]. Hungary will provide the communications equipment, motor vehicles, construction machines and mechanisms as well as materials and structures for the construction site. Electrical engineering equipment, automatic devices, construction gear and metal rolled metal products will arrive from Poland. Moreover, Polish builders will participate in the erection of the AES. Czechoslovakia will provide the construction project with process engineering equipment, transportation equipment, including large load capacity "Tatra" trucks and machine tool and press equipment.

The work on the electrical power transmission line from the Khmel'nitskaya AES to Zheshuv will go forward at the same time. This is a joint construction project of five nations: the VNR, GDR, PNR, USSR and CSSR. The line is intended for handling the planned deliveries of electrical power from the USSR (from the Khmel'nitskaya AES) to the partners in the construction project. The running of the 260 kilometer section on the territory of the USSR has been assigned to the Soviet Union. From the USSR border to the Zheshuv substation (117 kilometers), the line will be constructed by the construction organizations of the PNR using their own resources and equipment, provided by the VNR, GDR and CSSR.

With the start of the new line, conditions will be created to increase the reliability of the combined power systems of the CEMA member nations, and to increase the planned deliveries of electrical power from the USSR to the VNR, PNR, and CSSR. After the Khmel'nitskaya AES is brought up to full power, the deliveries of electrical power from the Soviet Union to its fraternal nations will double. Simultaneously, it will become possible to realize the additional intersystem effect, which can be obtained as a result of combining the load charts for the electrical power and the electrical power reserves. It will quantitatively amount to more than 500 megawatts.

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## ELECTRIC POWER AND POWER EQUIPMENT

### LONG-DISTANCE TRANSMISSION LINE CONNECTS WITH EUROPEAN CEMA COUNTRIES

Islamabad THE MUSLIM in English 18 Dec 79 p 5

[Text] The 750 K volt long-distance power line Vinnitsa/Ukraine/- Albertirse/Hungary/, inaugurated on 30 October 1979 to unite the southern Soviet energy supply system with those of the European CMEA countries, incorporates the final link to produce one of the world's largest integrated power-supply projects, the likes of which only exist in three countries: the inner Soviet Union, the United States of America and Canada. It is instrumental to double Hungary's import of electric energy from the Soviet Union, from 4,000 million to 8,000 million kw/hours per year by 1980, covering largely 20 percent of the country's total consumption.

The project itself dates back to 1974 when six CMEA countries/Bulgaria, Czechoslovakia, GDR, Hungary, Poland, Soviet Union/decided to unite their own national networks into an integrated system of high/750 kV/transmission capacity. The joint investment included plans to cover the building of 400 kV substations and branch lines, such as are necessary for conveying energy across the territory for each participating country. The construction itself was to be done by Hungary and Soviet Union, while each of the other countries contributed its share of the investment and operation costs in the form of supplied goods or performed work--for instance Czechoslovakia by building one section of the 400 kV branch line--and each will receive energy from the common system in proportion to the size of contribution it has made. The building work itself started in 1975 and involved the extension of two existing 750 kV soviet substations at Vinnitsa and Zapadnoukrainsk and the construction of one in Hungary at Albertirsa.

The transmission line runs the total length of 842 kms out of which 268 kms fall on Hungarian territory. The substation transformer units, which are up to contemporary world standards, have been produced by the 100-year-Ganz Electricity Works; so have been the 400 kV gas-insulation switches, under a production licence by Brown Boveri at Cie., Switzerland.

Soviet engineers on the staff of Energoprojekt company acted as general designers and Soviet specialists helped in fitting the automatic safety

equipment. The 750 kV switches, electric machines and apparatus are all Soviet made but Hungarian designs underlie the construction of the line section across this country.

The integrated power supply system makes it possible for the member countries to reduce their breakdown reserve capacities and to provide power for each other during the peak hours of consumption, because the peak load periods, for reasons of geographical distance and corresponding shifts in day-sections, are setting in at different points of time. As a further effect of the transmission line, the maximum power station output of the member countries can be reduced, thus saving a lot of investment cost.

CSO: 1812

## ELECTRIC POWER AND POWER EQUIPMENT

### INCREASE OF ATOMMASH PRODUCTION CAPACITY REPORTED

Moscow TRUD in Russian 19 Dec 79 p 1

[Article by A. Isayev, TRUD correspondent, Volgodonsk, Rostovskaya Oblast]

[Text] New capacities for the production of nuclear power equipment have been put into operation at the "Atomnash" Plant.

Yesterday, at the "Atomnash" Plant, the state committee signed the acceptance certificate for new capacities for producing nuclear power equipment for another million kilowatts a year. Now, the capacities of the enterprise for the annual output of this equipment increased to four million kilowatts. A meeting was held at "Atomnash" on the occasion of this important event. Its participants drafted a letter to the Secretary-General of the CPSU Central Committee, Chairman of the Presidium of the USSR Supreme Soviet, Comrade L. I. Brezhnev.

One of the accepted objects was a single-design press with a force of 15,000 tons.

This press is intended for shaping blanks into bottoms of vessels of reactors and steam generators for atomic electric power stations. V. Rogal', head of the plant's hot stamping office, gave us the parameters of the press: press height -- 10 meters, the working space of the table for placing hot blanks -- 9 x 9 meters, the weight of the press -- 6000 tons. This huge press will be operated by one man by pressing buttons on a control board.

Much has already been written about "Atomnash" as a plant equipped with the latest equipment. However, the most important area is the equipment controlling the processes. It is present everywhere. V. Alekseyev, leader of the welding brigade, showed us a set of commands on the control board of a high-precision unit for welding ferrules, steel rings from which vessels of nuclear reactors, steam generators, etc, are assembled. There are 16 commands, which is quite a few. Each of them is set up with consideration of all finer points of the welding process.

V. Kirichenko, thermal treatment specialist, told us about their thermal hardening complex, about the automation devices for it, and about the

operation of their shaft furnace according to a program: the program maintains the conditions necessary for thermal treatment. Upon completion of thermal treatment, the heavy doors of the furnace open up, the crane with three large holding devices picks up the white-hot blank and carries it swiftly to the tank with water. V. Kirichenko mentioned with pride that the entire process takes six minutes. But even this shop is not unique with respect to automation.

At "Atomnash", programmed control is used also in such spheres of production which were considered subsidiary before. In the blank cutting shop, units for oxygen and plasma cutting help the workers to cut metal according to a prescribed program. A. Legkiy, foreman of this section, explained that the accuracy of cutting is within three tenths of a millimeter and the quality of machining is high.

Quality monitoring is also done by electronic devices. Flaw inspectors are using sensitive automatic devices. One of them is "LUE-15", an electronic linear accelerator developed by the scientists of the Leningrad Scientific Research Institute of Electrophysical Apparatus. It is installed in X-ray chamber No 1, where the quality of seams of welded steel rings is checked. The main advantage of the Leningrad accelerator is its deep penetrating ability: it can "transilluminate" seams up to 500 millimeters thick and accurately find the smallest flaws.

The great Soviet scientist Igor' Vasil'yevich Kurchatov, whose bust is displayed in the main building of the plant, said: "The volume of atomic work is very great, but our strength is also great now." Along with the construction of this leading plant of our domestic atomic machine building, the skills of people are also growing. The main characteristic of this unique enterprise, whose name is "Atomnash", is that the control boards are operated by specialists who do not simply press buttons but know thoroughly the equipment entrusted to them.

The builders and operating personnel of this gigantic atomic machine building plant are preparing to mark the 110th Anniversary of V. I. Lenin's birth by their achievements.

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CSO: 1822

## ELECTRIC POWER AND POWER EQUIPMENT

### GROWTH OF ENERGY RESOURCES REPORTED

Moscow STROITEL'NAYA GAZETA in Russian 21 Dec 79 p 2

[Article by F. Sapozhnikov, USSR Deputy Minister of Power and Electrification]

[Text] In 1979, new capacities were introduced at thermal, atomic, and hydraulic electric power stations. Thermal stations: the ninth power unit at the Reftinskaya GRES of 500 megawatts was put into operation ahead of schedule; TETs of the Volgodonsk Plant introduced ahead of schedule; TETs of the Ust'-Ilimsk timber industry complex; Irklinorskaya GRES construction completed ahead of schedule; two blocks of 210 MW each at the Surgutskaya GRES; power unit (300 megawatts) at the Stavropol'skaya GRES; power units of 210 MW at the Pechorskaya and Gusinoozerskaya GRES. Atomic stations: million units at the Kurskaya and Leningradskaya AES. Hydroelectric stations: Nurekskaya GES brought to the design capacity ahead of schedule; hydraulic unit at the Sayano-Shushenskaya GES.

The following figures show convincingly the pace of the development of power engineering in the country: by the end of the Ninth Five-Year Plan the consumption of electric energy per capita was 4083 kilowatt-hours, while at the beginning of 1980, i.e., four years later, it will be approximately 4800 kilowatt-hours.

A still higher pace of the development of this industry, especially at a qualitatively new level, is envisaged in the near future. There will be fewer thermal stations operating on mazut, but instead the introduction of capacities at atomic and hydroelectric stations will increase sharply.

Atomic electric power stations of 4 to 6 million kilowatts each will be constructed in the European part of the country. It is planned to build thermal electric stations with power units of 250,000, 500,000, and 800,000 kilowatts which will be using the open-pit coal of the Ekibastuz and Kansko-Achinsk fields, as well as accompanying gas of Western Siberia. The

following are the plans for the development of hydraulic power engineering: expansion of the construction of the GES of the Angara-Yenisey cascade and complex hydroengineering facilities in Central Asia, as well as construction of pumped-storage electric power plants in the European part of the country.

The total introduction of generating capacities in the next five-year plan must approximately 20% higher than during the present five-year plan and almost double with respect to nuclear stations. In order to implement this program, it is necessary to improve the technology, organization, and management of power engineering construction.

Design organizations are now developing designs of series TES [thermal electric power stations], AES, GAES [pumped-storage electric power stations], and standard designs of electric power networks and settlements. Nuclear power construction combines are called upon to raise the level of industrialization in the construction of nuclear stations. Shops for producing sheathing plates of main buildings have already been put into operation. One of such combines is now under construction at the construction site of Zaporozhskaya AES. It includes a complex of specialized enterprises such as a plant of nonstandard equipment, reinforced concrete articles, and a DSK [house-building combine]. The changeover of the construction of nuclear stations to flow line production will make it possible in the next decade to introduce capacities of approximately eight million kilowatts annually and at the same time to reduce labor input considerably.

In constructing thermal stations, experience of the builders of Ladyzhinskaya and Zaporozhskaya GRES will be used widely. They showed that, if the series construction method is used, it is possible to reduce labor input by approximately 20%. If designs are repeated, it is also possible to repeat the systems of making sets of equipment and to transfer construction and installation workers in an organized manner from one project to another. At the present time, the process of the construction of such objects is essentially changing to the process of installation of larger units of equipment, as well as of structural units.

It is planned to develop specialized enterprises of the construction industry for the construction of the largest thermal electric power stations of the Ekibastuz, Kansk-Achinsk, and West Siberian complexes. In order to prepare structures and equipment for large-block installation, i.e., in order to raise the level of industrialization, rayon production and unit-assembly bases are being created.

Builders of hydroengineering complexes are also faced with an acute problem of the intensification of construction and the lowering of labor input. For example, good experience has been accumulated in increasing labor productivity of concrete jobs during the construction of the dam of Chirkeyskaya GES. A still greater degree of intensification is envisaged in the process of placing concrete and soil masses which is being developed for

Roginskaya, Bureyskaya, and Boguchanskaya GES. It will make it possible to introduce units of a total capacity of over four million kilowatts annually at hydroelectric power stations.

The experience of the construction of LEP [electric power transmission line]-750 Donbass -- Al'bertirsha and Moscow -- Leningrad, as well as of mountain electric power transmission lines of 500 kilovolts Nurek -- Regar, Toktogul -- Andizhan and LEP of Western Siberia also deserves wide dissemination. In order to accomplish the ever-increasing volumes of jobs in the construction of electric power lines in the eastern regions of the country, new enterprises are being created there for manufacturing galvanized metal structures of supports, centrifugated supports, sectional foundations, foot plates, traverses, rapidly assembled substation buildings and complete transformer substations designed in blocks.

The production of heat-insulating materials and products for the needs of district-heating systems is expanding.

Naturally, scientific studies on improvements in the construction of electric power facilities are of primary importance. In order to enhance the role of science and accelerate the introduction of the achievements of the scientific and technical progress, we are changing research, design, and technological organizations to a self-supporting basis.

Unfortunately, nonindustrial and technologically ineffective solutions are still being used in the construction of power facilities, the number of workers engaged in manual work is still high, machines and motor vehicles are still used insufficiently effectively, and losses of working time are considerable. There is still much to be done by engineers, scientists, managerial personnel, workers, and the headquarters of the industry to increase the return on each ruble invested in the national economy. But the acceleration of the pace of construction of power facilities also depends greatly on machine builders. First of all, they must manufacture high-quality equipment and cables and supply them in complete sets. A rapid pace of the development of electric power engineering can be ensured only by our joint efforts.

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## ELECTRIC POWER AND POWER EQUIPMENT

### 'ELEKTROSILA' POWER MACHINE PLANT RECONSTRUCTED

Moscow STROITEL'NAYA GAZETA in Russian 23 Dec 79 p 2

[Article by N. Andreyeva, engineer, Leningrad]

[Text] Plants are usually placed away from the main streets. But this one is located on one of the most beautiful boulevards of Leningrad. It is difficult to say whether the city was built around the plant, or the plant attracted the city to itself because the "Elektrosila" is so well integrated in the splendor of Moscow Boulevard.

An old photo from the museum of the history of this enterprise shows low buildings and sheds chaotically arranged behind a fence stretching along the street. Such was "Elektrosila" in the twenties. At that time, its production areas amounted to 20,000 square meters. At the present time, each of its shops, on the average, has the same area.

Today, over 60% of electric power produced in the USSR comes from generators manufactured by this gigantic Leningrad plant. Its trade mark is known on all continents of the earth. Series turbogenerators of 500,000 and 800,000 kilowatts including those for the Leningrad Nuclear Electric Power Station, electrical equipment for the powerful nuclear ice breakers "Arktika" and "Sibir", custom-made machines for the rolling mills of the Kirov Plant, a giant 1.2 million kilowatt turbogenerator for the Kostromskaya GRES, and all other products must be the best and of the highest quality. It is no coincidence that the movement under the slogan "State Emblem of Quality to each new product" was started at "Elektrosila".

One of the main sources of the steadily increasing capacity of the means of electrification is modernization of the enterprise. The "Elektrosila" Association can serve as an example of complex reconstruction. The production of special-design machines became possible after the replacement of the shops built during prerevolutionary years with buildings equipped with the latest equipment: engineering laboratory, large-block equipment building, pilot model manufacturing building, and the building for testing high-capacity turbogenerators. It is also just as important that the work of the personnel during this entire period did not stop even for one day.

The architectural appearance of the enterprise also changed radically. Its reconstruction was based not on selective construction, but on the ensemble principle which is traditional and characteristic of Leningrad. All buildings have similar vertical pylons. The architects succeeded in blending new buildings with the existing ones. The design developed in the GPI [State Planning Institute]-1 received well-deserved recognition.

However, the builders had some difficulties: there was too much labor-consuming brick masonry. But at that time there was no other way out. The plant buildings would have hardly lent beauty to the boulevard if structural components available at that time were used. At the present time, the list of structural components has expanded considerably, and Glavzapstroy [Main Administration for Construction in the Western Regions of the RSFSR] expects to use successfully prefabricated lightweight aggregate concrete panels in the construction of the thermal welding building.

Every year, Glavzapstroy's Trust No 39 introduces a new capacity at the "Elektrosila" Plant. At the present time, the workers of the association are busy moving into a new building, an insulation winding shop built deep within their territory a few meters away from the entrance to the motor-vehicle tunnel passing under Moscow Boulevard.

The builders of the 91st administration of Trust No 39 made high socialist pledges at the beginning of the year: to complete a building two months ahead of schedule -- by 7 November. From the very first days they started working at a high pace. They completed two thirds of the jobs in six months. The party headquarters concentrated its efforts on maximal utilization of all reserves of production and effective cooperation of all participants in construction. Unity of word and deed became a reliable guarantee of success. By the beginning of November, the builders completed the building and, which is particularly gratifying, delivered it for occupancy without any unfinished jobs.

Relations with customers are now based on a qualitatively new level.

V. Yershov, construction section chief, commented as follows: the plant gave us substantial help by delivering an overhead crane three months ahead of schedule. Due to accurate calculations, a favorable situation was created. The roof was not yet covered, and the crane was put in through an open span without disassembling it. The entire operation took six hours instead of seven days.

"Elektrosila" helps the builders also by providing tools and making molding equipment for wall panels.

The renovation of "Elektrosila" is continuing. In 1980, the following large projects are planned for completion: 16,000 square meters of areas of the thermal welding building, the third section of the building for powerful turbogenerators, and a transportation shop.

This will require more than three million rubles worth of jobs. A still greater volume of construction and installation jobs is planned for the next five-year plan, when the reconstruction of the plant will enter the second and concluding phase.

At the present time, construction jobs in the association are conducted by three organizations: Trust No 39 is engaged in the reconstruction of the main enterprise, Trust No 68 is building a shop located in a different region of the city. Finally, foundations for new equipment in the existing shops are being built by the repair and construction trust of the Ministry of the Electrical Equipment Industry.

In this connection, it was proposed to reorganize Trust No 39 into a construction association Elektrostroy within the system of Glavzapstroy which would undertake not only the construction of "Elektrosila", but of all facilities of the Ministry of the Electrical Equipment Industry in Leningrad and in the oblast. Creation of this association promises many benefits. It will be easier to coordinate operations, concentrate the necessary equipment at each construction site, and to provide manpower resources and materials for construction projects.

Another urgent problem is close to being solved. As is known, in order to enhance the interest of the organizations participating in reconstruction, correction coefficients have been introduced for the existing estimated norms for construction and installation jobs. The same was also done at "Elektrosila". But these coefficients, according to the SNIP [Construction Norms and Regulations], do not exceed 10-15% of the cost of wages and operation of machines. This constitutes approximately 3% of the estimated cost of construction. However, the unavoidable additional expenses of the Leningrad construction organizations are higher. At "Elektrosila", which is situated in the central part of the city, even the delivery of concrete to the construction site is connected with many difficulties, truck do not have enough room to turn around. It is also impossible to store reinforced concrete. It is unloaded on one of the adjacent streets and then one item at a time is delivered to the construction site and installed immediately.

This year, Glavzapstroy's Orgtekhnstroy Trust, the department of estimates and contracts of Trust No 39, and the Standards Research Station are using a new method of the USSR Ministry of Construction to check the calculation of additional costs for a number of projects, including "Elektrosila". The correction coefficient will be approximately 15% of the estimated cost of the project.

"Elektrosila", a giant of the Soviet power machine building industry, deserves looking for any possibility and using all levers for its effective and intensive renovation.

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## ELECTRIC POWER AND POWER EQUIPMENT

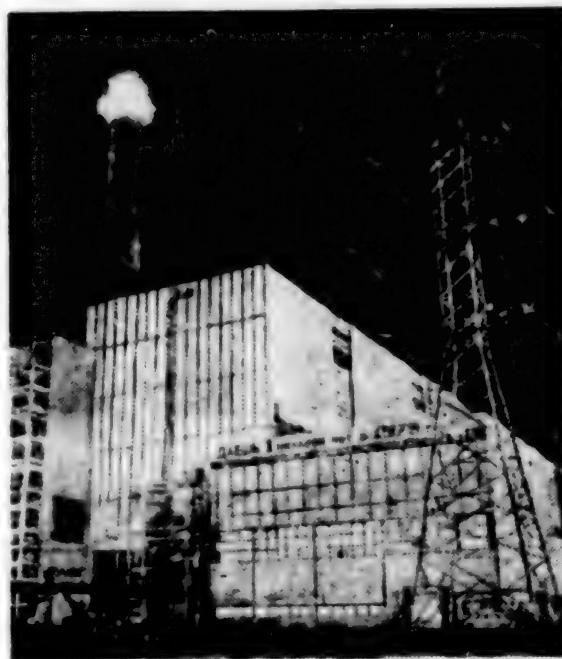
### CONSTRUCTION OF EKIBASTUZSKAYA GRES-1 REPORTED

Moscow PRAVDA in Russian 13 Oct 79 p 2

[Article by TASS, photo by N. Kuznetsov]

[Text] The construction of the Kazakhstan's largest thermal electric power station, Ekibastuzskaya GRES-1 entered a decisive phase. Provisions for its construction were made in the resolutions of the 25th CPSU Congress. At the present time, its first generator of 500,000 kilowatts is being readied for operation, and the second generator will be delivered by the end of the year.

Photograph: day and night work is in progress in the main building of Ekibastuzskaya GRES-1.



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## ELECTRIC POWER AND POWER EQUIPMENT

### RURAL ELECTRIFICATION PLANS FOR THE EIGHTIES

Dushanbe SEL'SKOYE KHOZYAYSTVO TADZHIKSTANA in Russian No 7, Jul 79 pp 42-45

[Article by B. Sirozhev, deputy chief, Main Industrial Administration of Power and Electrification of the Tadzhik SSR, candidate of technical sciences; "Rural Electrification--An Important National-Economic Task"]

[Text] It is difficult these days to imagine a farm community without well developed electrification. Electric power is used in service facilities, during threshing, the cleaning and sorting of grain, the drying of cotton, for farm water supplies, shearing sheep, milking cows, creating a micro-climate on poultry farms, distributing feed, etc. Huge power stations and power systems have been employed for supplying rural power since 1954.

In a resolution of the CPSU Central Committee and the USSR Council of Ministers titled, "Measures for the Further Development of Rural Electrification," mention is made of the fact that recently considerable work has been carried out on the construction of rural electric networks, and on the expansion of the use of electrical power in agricultural production and to provide for the cultural well-being of the population. The development of national power systems through the consolidation of rural electric networks has facilitated the realization of an important stage in rural electrification--the providing of electrical power to all kolkhozes, sovkhozes, interfarm and other agricultural enterprises and organizations, as well as to the living quarters of kolkhoz and sovkhоз personnel.

In 1966-1978, the construction organizations of the Tadzhik Main Power Administration alone put into service in public rural areas more than 7500 km of 6-20 kilovolt power transmission lines, and about 12,000 km of 0.4 kilovolt lines. This has permitted rural electrification to climb to a much higher level in a qualitative sense. It will suffice to note that in 1978 the centralization of the agricultural power supply approached 99.8 percent, while from state electric-stations and power-systems, Tadzhik agriculture drew 2.2 billion kilowatts of electric power, which comprised 27 percent of the electrical consumption of the entire republic. According to this index, Tadzhikistan occupies the leading position in the country. This bears witness to the fact that electric power has solidly entered

the work and lifestyle of this republic's rural population. Electric transmission lines and substations with a capacity of 35, 110, and 220 kilovolts have now become a common occurrence for rural areas. Without them it would not have been possible to develop the huge tracts of previously barren land, to introduce machine-aided irrigation.

The industrialization of agricultural production on state, kolkhoz, and interkolkhoz poultry operations, cattle farms, hog farms, and other agricultural enterprises and organizations without the use of electricity is simply inconceivable.

The above mentioned resolution puts before electrical engineers the task of raising the volume of electric power consumption in the country's agriculture by 1985 to 170-190 billion kilowatt/hours; to increase during 1981-1985 the electric power/labor ratio in agricultural production by a factor of 1.6-1.8 and the use of electric power for the daily communal needs of a single rural resident by a factor of 1.8-2.0; and to implement a gradual transition from the automation of discrete production processes and operations to a total automation of shops and agricultural enterprises.

Projected for the Tadzhik SSR are: the installation of 1368 kilometers of 35-110 kilovolt power lines; 7200 km of 0.4-6-20 kV LEP [power transmission lines]; transformer substations with a capacity of 35-110 kV-290,000 kilovolt/ampères; the restringing of 1,100 km of elevated LEP; and the expansion of the Kurgan-Tyubinskiy transformer plant for the release of size II transformers.

The CPSU Central Committee and the USSR Council of Ministers determined that, beginning in 1981, the installation on kolkhozes and interkolkhoz enterprises (within organizations) of 0.4 kV transmission lines into production areas, cultural welfare projects, and kolkhoz living quarters, as well as the construction of transformer substations with a capacity of 35-10-6/0.4 kV incorporated into state power systems must be accomplished at the expense of state capital investments allocated under the heading, "Agriculture."

In our republic, power transmission lines and transformer substations for rural electrification, maintenance-production depots, and maintenance-operations points will be erected and put into service. Measures for increasing the reliability of electric supply to agricultural production projects and individual electrified agricultural-technological processes will be developed and implemented.

The work experience of the interfarm production-operations associations, "Sel'-khozenergo" created in a number of union and autonomous republics, oblasts, and rayons for the organization of technical operation of power and electrotechnical equipment and plants belonging to kolkhozes, sovkhozes, and other agricultural enterprises and organizations--will be studied and widely disseminated by the Ministry of Agriculture of the Tadzhik SSR, the Main Production Administration of Power and Electrification of the

Tadzhik SSR, and by the State Committee of the Tadzhik SSR for Agricultural Technical-Production Security.

Most of the electrical energy used in agriculture is consumed by machine-aided irrigation stations. Under present conditions when the resources of valley lands where the processes of irrigation were accomplished by gravity are for the most part exhausted, the question of developing additional land areas entails massive electromechanical lifting of water, which requires the construction of transformer substations and the installation of electric power lines with a capacity of 35 kilovolts and higher.

The accomplishment of the measures outlined will permit an increase in reliability, a raising of service levels, and will promote the transition of agriculture onto an industrial course.

A powerful energy base capable of providing all of the requirements of agriculture has been created in the republic. Toward the end of this year, the Nurekskiy GES [hydroelectric station] will achieve a projected capacity of 2.7 million kwt. Construction is being carried out on the Rogunskiy GES, rated at 3.6 million kwt, and the Bayzinskiy GES, projected at 600,000 kwt. Thanks to the presence of vast hydropower resources, and the lack of any significant flooding factor for the river plains, hydroelectric stations and their reservoirs in our environs have both power and irrigational significance.

Development of the Ashtskiy, Kizilinskiy, Beshkentskiy, and Karadumskiy Massifs, the Dangarinskiy Plateau, the Nizhne-Kafirniganskiy, and the Kzyl-Yakhsuyskiy irrigation systems, and others demands huge energy capacities. During such development here, it is essential that high-voltage transmission lines and transformer substations for providing electric power to pumping stations be erected.

Cattle, poultry, and swine raising operations are also the heaviest consumers of electrical energy. They are placed in the first category of consumers with regard to the need for reliability of electric supply. Among such projects--the Ordzhonikidzeabadskaya poultry plant, the Gulistanskiy cattle raising and the Ganchinskiy swine raising complexes now under construction, the Khovalinskiy agroindustrial association, and a number of others. To provide them with an uninterrupted supply of electrical energy requires the installation of 35-110-220 kilovolt transmission lines, and the construction of electric substations with required automatic switching to secondary reserve supplies.

Electrification in rural life is, first of all, a social issue. Currently, with the exception of separate, almost inaccessible, mountainous population areas, for the most part all living quarters for kolkhoz and sovkhoz workers are electrically supplied. In every rural family there is a television, a refrigerator, an electric iron, vacuum cleaner, fan, washing machine and other electrical appliances.

In our republic (in the Kurgan-Tyubinskiy Rayon), a nationally unprecedented scientific-industrial experiment on the electrification of heating requirements in the lifestyle of the rural population was instituted. At the present time, work is being conducted on the total electrification of rural life in the Garmskaya group of rayons, and in the Gorno-Badakhshanskaya Avtonomnaya Oblast' where panels will be experimentally installed for the solar heating of living quarters (slotermy), electric plates for the preparation of food, and other electric appliances and apparatus. As we know, in the indicated rayons and in GBAO, the rate for electrical energy consumed by the populace for daily needs has dropped to one kopeck per kilowatt/hour.

The accomplishment of the tasks put forth in the resolution of the CPSU Central Committee and the USSR Council of Ministers regarding the further development of rural electrification will permit the raising of agricultural production efficiency and the improvement of social conditions for rural workers.

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CSO: 1822

## ELECTRIC POWER AND POWER EQUIPMENT

### LENINGRAD AES INCREASES POWER OUTPUT

Moscow PRAVDA in Russian 8 Dec 79 p 1

[Article in the column "The Construction Chart": "The Third Power-Block"]

[Text] The Pine Forest (Leningrad Oblast'), 7. (PRAVDA correspondent). There is a joyous mood today among construction workers and operators of the Leningrad Atomic Electric Station imeni V. I. Lenin. A festive elation is felt in all parts of the vast structure. A new labor victory has been won--the third power-block has delivered commercial current ahead of schedule. With the output of its generating units to projected parameters of capacity, the LAES [Leningrad Atomic Electric Station] will attain three million kilowatts.

"Switch the generator into the grid!" said the chief engineer of the LAES, A. Eperin.

The decision to put the turbine equipment under load brought to culmination the long, intense labor of a thousand people. The shift supervisor, B. Poshelyuzniy, turned the key in the panel--the pathway for the flow of supplemental electrical energy was opened! From this moment, the third block begins to serve the Five-Year Plan.

"Each new unit is put into service faster than its predecessor," discloses the director of the LAES imeni V. I. Lenin, N. Lukonin." The experience accumulated by construction workers and installers, and the aggressive application of advanced forms of labor organization and production are discussed. Of major significance for the mobilization of collectives is an understanding of the great importance of the accelerated development of atomic energy.

In order to obtain as much electricity as that produced, for example, by the Leningrad AES, it would be necessary to burn in furnaces 11 million tons of coal yearly. For its transport at least 140,000 coal cars would be needed. The atomic reactor achieves the same result with several dozen tons of uranium.

Presently, the demand for nuclear fuel, naturally, is increasing--fuel is essential for the new million-watt reactor as well. It was completely installed within a year. Here and in the installation of communications, turbines, and generators, the collectives worked by the brigade contract method. The new installation technology also helped to noticeably shorten the period of completion of the most important units of the burgeoning complex: They assembled the structures on a special base in enlarged blocks beforehand, and then conveyed them to the installation site. A telling comparison speaks eloquently about the urgent work of the builders of the LAES. From the beginning of construction-installation work until the release of energy in the first block, six years had passed. The second block was ready for release in four years and 10 months. The third was put into service eight-and-a-half months faster yet.

We enter a vast half-empty chamber through a massive door. In the center level with the floor is a disc many meters wide composed of hundreds of square steel blocks.

Under this "lid" is the atomic chamber, as the director points out. Incidentally, in the reactor chamber as well as in any other service area of the station, one may work without any sort of special precautionary measures--a biological protection system fully precludes permissible radiation levels.

Specialists from various professions, including biology and medicine observed how the station affects its surroundings through an entire year of the LAES's operation. Indeed, the powerful reactor operates not very far from Leningrad. Careful observations indicate that a common boiler house on a city block pollutes the atmosphere and adjacent territory far more than an atomic station. Watchful control over the unexceptionable makeup of the system with the aid of hundreds of sensitive gauges in the most hidden borders of the station guarantees freedom from accidents.

With respect to design and engineering solutions and the improvement of applied technique, the Leningrad AES has no equals. It is the leader in comparison with atomic electric stations now being outfitted in other regions of the country as well.

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## ELECTRIC POWER AND POWER EQUIPMENT

### STATE REGIONAL POWER STATION IN SURGUT DESCRIBED

Moscow STROITEL'NAYA GAZETA in Russian 7 Dec 79 p 1

[Article by V. Badov, Surgut correspondent: "Where is the Old Power?"]

[Text] What is preventing the builders of the thermal electric stations in Tyumen from adequately preparing for the coming increased work volume?

The outlook for the development of thermal energy in Tyumenskaya Oblast' is tremendous. By 1990 the total capacity of thermal electric stations should exceed the present level by several times and will constitute approximately 20 million kilowatts. Surgut, Urengoy, Tobol'sk--these are the new energy centers of Siberia which will supply energy to the petrochemical workers of Tobol'sk, the oil and gas workers of the central Ob' area, and to cities which are not yet on the map.

In Surgut, the first GRES [state regional power station] is already operating. Its main feature is the use of casing head gas for providing electrical energy. This is a gas which today is burned uselessly in torches. Sometime this year the 11th unit of the Surgut GRES-1 should be put on line. Preparation for outfitting the third stage of the station--two blocks of 250,000 kilowatts each--is underway.

Even more powerful--4.8 million kilowatts--will be the Surgut GRES-2. Units having a capacity of as much as 800,000 kilowatts will be installed here. The first of them should come into operation in 1983.

The director of the trust, Zapsibenergostroy [Western Siberia Energy Construction Company], Ye. Zevakov, calls the time frame involved strict. There are reasons for this. It is impossible to dawdle, not only because electrical energy is badly needed, but also because the possibilities of obtaining it with the least amount of cost are limited in time. Specialists calculate that the Surgut GRES can be fully supplied by casing head gas only until 1985. After this, they believe, it will be necessary to add natural gas from gas pipelines to the fuel "ration" of electric stations, which is by no means practically free, as is casing head gas.

Therefore, every year of delay in the construction of new energy systems turns into losses for the state.

However, builders are not ready for the increase in work volume. The trust has to a great extent lost its former power. In the opinion of Ye. Zevakov, this very year he will not fulfill the plan for 10 million rubles worth of construction and installation work. The reason for the shortfall--personnel turnover produced by housing deficiencies. In its period of difficulty the trust fell two years behind, after which it was detached from the Uralenergostroy [Ural Energy Construction Company]. Consequently, the Nizhnetagil'skiy DSK [Housing Construction Branch] of the USSR Ministry of Energy sharply cut back delivery in Surgut of housing construction components.

Yet, indeed, in the near future, the collective of builders for GRES-2 should grow to 8,000 people. They will require 230,000 square meters of housing, schools and kindergartens. How will it be in the future if even today the trust has 1,400 people in line for living space? In all fairness, it should be noted that in Surgut they are not waiting for the intervention of the Ministry, but are energetically seeking a way out of the cul-de-sac. At a local precast ferro-concrete products plant they have decided to adjust the output of prefabricated houses. However, the resources of the company are modest. It is impossible to manage without centralized deliveries of houses in Surgut. It would seem that the operational aid of the USSR Ministry of Energy is needed in the resolution of all these pressing problems. Only then will the collective of Surgut energy construction workers, not only find their lost power, but also take a stride forward.

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CSO: 1822

## ELECTRIC POWER AND POWER EQUIPMENT

### MEASURES TAKEN TO INCREASE BOILER-TURBINE RELIABILITY

Moscow IZVESTIYA in Russian 15 Nov p 1

[Article: "USSR Ministry of Power Machine Building"]

[Text] The Ministry of Power Machine Building, having acquainted itself with materials published under the general heading, "Half-Strength and Exorbitant" (IZVESTIYA, No. 227), communicates the following. The staff of the Minenergomash [Ministry of Power Machine Building] has considered urgent measures which are essential for increasing the reliability of rotor blades of three-stage low-pressure turbines, K-300-240, of the industrial association, "Khar'kovskiy Turbine Plant" imeni S. M. Kirov, and for creating reserves of them during the fall-winter peak of 1979-1980.

In accordance with the schedule officially approved by the Minenergomash, and the USSR Ministry of Energy, 22 runs of rotor blades and six supplemental runs will be manufactured this year, and also 28 runs in 1980. This will permit an accumulation of the necessary reserve of extra blades. In January 1980 plans were initiated for the completion of a full-scale investigation into the operating conditions of the most recent modification of the blades, with increased reserve of dynamic strength.

Because of the unsatisfactory work of the scientific-industrial association TsKTI [Central Institute of Boiler Turbines] imeni I. I. Polzunov as a leading organization in the field, upon revelation of the factual causes of the unreliable performance of the rotor blades apparatus of the low-pressure turbine K-300-240, the general director of the association, T. Markov, was given a reprimand. A reprimand was also given to the chief construction engineer of steam turbines of the manufacturing association, "Khar'kovskiy Turbine Plant" imeni S. M. Kirov, T. Kosyak. For the failure to take proper measures in the organization of operations related to increasing the reliability of rotor blade fitting in the low-pressure section, the directors of the ministry's technical administration were given warnings.

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## ELECTRIC POWER AND POWER EQUIPMENT

### BRIEFS

**PERM POWER PLANT**--Of the thermal electric stations under construction in our country, the Perm GRES [State Regional Electric Station] is one of the largest. Six power-blocks of 800,000 kilowatts each will operate on solid fuel. Plans here call for approval of the most up-to-date achievements of national-patriotic power engineering. Unique equipment is being created for the GRES. A boiler which is the first of its kind in the country is being prepared for operations on coal at temperatures of 540 degrees at a pressure of 250 atmospheres. Its capacity is 2650 tons of steam per hour. The turbine is also unusual. It should be the most economical of all those in operation. In short, the business of important construction is proceeding satisfactorily. However, today here they do not know the main item--the projected date of activation of the first power-block. Initially, it was planned for 1982. For this as much as 29 million had been allocated for production in the industrial sector in the current year--so stipulated the schedule of works. However, the USSR Ministry of Energy has allotted only 13 million rubles of capital investments. For next year the job has been fixed at 16 million, though the figure initially projected was 40 million. Is it really necessary for the Ministry to prove that the longer construction continues, the more it will cost? Indeed, the construction administration collective of the Perm GRES is ready today to perform larger volumes of work than are being planned for. [Excerpts] [Moscow STROITEL'NAYA GAZETA in Russian 12 Dec 79 p 1] 9481

**POWER LINES CONNECTION**--Chardzhou (Turkmen SSR), 17 Nov (TASS)--The installation of specialized LEP [electric transmission lines]-500 Mary--Karakul' through Amudar'ya. Two support structures higher than 150 meters elevate the conduit over the river. The LEP will carry current from the Maryyskaya GRES into a common power system for Central Asia. [Text] [Moscow PRAVDA in Russian 18 Nov 79 p 2] 9481

**TYUMEN' GAS LINE**--On the eve of the October holidays one of the boilers of the Tyumen'skaya TETs switched over from solid fuel to gas. The blue fuel first entered the city along a 35-kilometer conduit--a branch from the main trunk gas pipeline of Urengoy [Ural Power Construction]--Chelyabinsk. The complicated route crossed the city's communications lines at many points. It was installed by units of the Minneftegazstroy [Ministry of Oil and Gas

Pipeline Construction]. Taking part in the construction were the organizations, Minenergo [Ministry of Energy], Mingazprom [Ministry of Gas Production], and industrial enterprises. By the end of the five-year plan, all station boilers will be operating on the blue fuel. [Text] [Moscow STROITEL' NAYA GAZETA in Russian 16 Nov 79 p 2] 9481

SAYANOGORSK HYDROELECTRIC STATION--In the construction of the "little sister" to the Sayano-Sushenskaya GES--the Maynskaya--a major stage of operations has begun--the pouring of the left-bank foundation area. The collective of the Administration of Heavy Earth-Moving Operations of the Krasnoyarsk GES Construction undertook this operation. In comparison with the larger Sayano-Shushenskaya GES in our country, the Maynskaya electric station in a literal sense is a baby: its capacity totals 340,000 kilowatts. But it will have very great significance. Being counter-regulating, this GES smooths the sharp fluctuations in water level in the Lower B'yef; it will protect the shores of the Yenisey from erosion, and retain an essential water resource in the river. [Text] [Moscow STROITEL' NAYA GAZETA in Russian 18 Nov 79 p 2] 9481

TURBOGENERATOR IN ARMENIA--At the Armenian Atomic Electric Station installation was completed on the third turbogenerator of 220,000 kilowatt capacity. It was put on free-idle two months before term. Installation workers of the trust Kavkaz Power Installation completed a large work volume at high levels of quality control. The overall weight of the metal mounted in work areas approaches 2000 tons, thousands of meters of pipe fittings were laid down, and 300 cubic meters of insulation were installed. Installation workers have already begun assembly of the fourth turbogenerator. They are committed to finishing it by 10 Dec of this year. [Text] [Moscow STROITEL' NAYA GAZETA in Russian 18 Nov 79 p 2] 9481

KAMA RIVER FLOODGATES--Leningrad--A floodgate for the Nizhnekamskaya GES has been urgently manufactured at a plant with hydromechanical production equipment. The 67 ton piece of hardware is projected for delivery in January of next year, but its shipment to the customer had begun even yesterday. In response to the request of hydro-construction engineers with work schedules completed ahead of term it was decided to install in the Kama a full set of three steel gates. [Text] [Moscow MOSKOVSKAYA PRAVDA in Russian 27 Nov 79 p 1] 9481

VORONEZH ATOMIC REACTOR--Voronazh--Work proceeds around the clock on construction of the fifth block of the Novovoronezhskaya Atomic Electric Station. Its activation grows near. A running check of the equipment and technological systems has been completed. The reactor is prepared for loading with fuel. The turbine is undergoing tests. Competing among themselves, construction workers, installers, adjusters, and operators exhibit their modes of work. [Text] [Moscow PRAVDA in Russian 21 Nov 79 p 2] 9481

UNIQUE POWER EQUIPMENT--Leningrad--More than half of all power equipment manufactured in the country is the product of the Power Machine Construction Company of Leningrad. The association, "Electropower" supplies unique electrical machinery. Turbine generators with a capacity of 800,000 kilowatts enter production runs here. Developed here was the machine with a capacity of a million kilowatts for the Kostromskaya GRES, and after it a still more powerful device--1,200,000 kilowatts. Presently, "Electropower" workers are laboring over the next "million-kilwatter" for the South-Ukrainian GRES. This unit represents a new, higher class of equipment. In it, the "throughput" of electrical energy is provided not from two poles, but from four. [Text] [Moscow SEL'SKAYA ZHIZN in Russian 22 Nov 79 p 1] 9481

PARTS FOR ATOMIC STATIONS--The manufacture of a unique product for atomic electric stations has been achieved by one of the youngest enterprises of the East Kazakhstan--the Ust'-Kamenogorsk Armature Plant. The first batch of hermetically sealed valves with nominal inside diameter of 1400 millimeters has been dispatched to the address of the Rovanskaya AES, now under construction. These imposing pieces of hardware weighing in at three and a half tons are the first to be produced in the field. Testing has yielded good results, and the plant has received demands for a supply of this product. [Text] [Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 4 Nov 79 p 1] 9481

TURBINE READIED--Cheboksary--Installation was completed on the stator for the first turbine at the Cheboksary CES under construction. The first units should be delivering current at the end of the Five-Year Plan. Their successful activation greatly depends on the timely and careful installation of the stator, one of the most important components of the turbine. Special precision and high production standards are required during its installation. The Cheboksarskaya GES with a capacity of 1,400,000 kilowatts is the final steps in the Volzhskiy power system. [Text] [Moscow TRUD 11 Dec 79 p 1] 9481

AMYDAR'YA DAM--Druzhba (Khorezmskaya Oblast'), 6 Dec (TASS)--Builders of the Tuyamuyuskiy Hydroelectric Works, the largest in Central Asia, today completed damming of the Amudar'ya. Now its entire flow enters the new artificial river bed and passes through the gates of the concrete dam. The capricious river has been securely dammed, and hydroelectric engineers have created a solid base for fulfillment of their accepted commitment: to put into operation by next summer--a half year earlier than scheduled--the first line of the hydroelectric works, two reservoirs with a capacity of 2.6 billion cubic meters. Water accumulated here will be used for irrigation of Uzbekistan and Turkman fields. With the entry of the hydroworks' second lin. into service, the artificial "sea" will hold about eight billion cubic meters of water, the major part of which will be expended for irrigation. This will allow the creation at the juncture of two deserts--the Karakum and the Kyzylkum--of a vast zone for the raising of cotton and rice, and to develop and improve water provisioning for a million hectares

of land. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 7 Dec 79 p 2] 9481

VAKHSHA HYDROSTATION--Equipping of the Baypazinskaya GES, which construction personnel call the "little sister" of the Nurek, has begun. The new station is the sixth of eight such stations in the Vakhshskiy Power System. The Baypazinskaya GES is being built on the site of an already functioning hydrostation which has been irrigating the virgin lands of the Yavanskaya valley. The first peacetime explosion on the right bank of the Vakhsha heralded the beginning of work. The operator of the huge electro-earthmover, Khayrullo Fayzullaev, dug the first buckets of earth under the construction site on the opposite bank. The outfitting of the Baypazinskaya GES was commissioned to collectives of "Nurekgesstroy" [Nurek GES Construction] and its subcontracting organizations which had assured ahead of schedule the activation of the Nurekskaya GES at full projected capacity. Initial construction work of the preparatory period and basic equipment installation was simultaneously coordinated so as to significantly hasten the station's activation. Forthcoming will be a project raising the height of the existing dam by 20 meters--the amount that the river bed of the Vakhsha will be raised. Daily regulation of the reservoir will allow normalization of the flow of river water into irrigation of lands of the Amudar'ya basin, and raising the work efficiency of the Nurekskaya GES, especially in the peak load period. Electrical generating equipment with a general capacity of 600,000 kilowatts will begin to deliver 2.5 billion kilowatt/hours of electric power at the end of the 11th Five-Year Plan. [Text] [Moscow PRAVDA in Russian 10 Dec 79 p 2] 9481

ASHKHABAD POWER LINES--Above the sand hills along the blue, ribbon-like Karakumskiy Canal a river of electricity stretches for 250 kilometers: completed precisely on schedule, they are the Ashkabad-Kizyl-Arvat LEP [Power transmission lines] with 220 kilovolt tension. This trunk line has delivered current to the Maryyskaya GRES in the rayon where Amudar'ya water recently arrived. Farms of the oasis which sprang up in the canal zone, petro-industries, and other enterprises have received power. Since the beginning of the Five-Year Plan, about 4,000 kilometers of power lines have been installed in the republic. [Text] [Moscow STROITEL'NAYA GAZETA in Russian 30 Nov 79 p 1] 9481

POWER PLANT PLAUDIT--Leningrad--Yesterday, a month under the scheduled time, the fifth power unit of the Leningrad Atomic Electric Station imeni V. I. Lenin delivered industrial-quality current. Director of the LAES, N. Lukonin, comments on this event: "First of all, it should be mentioned that with the fifth unit's entry into operation our station became, not only the largest in the Soviet Union, but in Europe as well. The work of installation workers was commendable--they promptly handled the filling of crucial orders of power machine construction engineers of the Leningrad firm, "Electropower", and Kharkov

turboconstruction engineers. Already this year we are producing approximately 36 percent of the overall volume of power from the Leningrad power system, and next year our contribution will make up about half." [Text] [Moscow TRUD in Russian 8 Dec 79 p 1] 9481

POWER UNIT COMMITMENT--Energetik (Turkmen SSR)--The installation of the turbogenerator of the fifth power-block of the Maryyskaya GRES was completed ahead of schedule. This guarantees that the builders will successfully fulfill their commitment to supply the unit a month under schedule. With its activation, the station capacity will surpass a million kilowatts. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No. 48, Nov 79 p 5] 9481

POWER LINES THROUGH TAIGA--Zeya (Amurskaya Oblast')--A taiga cross-cut for electric transmission lines of the Zeyskaya GES--BAM [Baykal-Amur Main Railroad Line] was made through rocky outcroppings surrounding the stations dam. This difficult tract was subdued quite ahead of schedule by a work crew from the Zeya GES Construction which laid a 180 kilometer "corridor" for LEP [electric power transmission lines] through the taiga. The lines become the third powerbridge from the hydrostation to the main line. Current from the GES is already flowing into Tynda, and they are preparing to receive it in other settlements. For the delivery of support structures for the lines, helicopters will be employed. [Text] [Moscow SEL'SKAYA ZHIZN in Russian 13 Nov 79 p 1] 9481

NEW SENSING INSTRUMENT--There is a remarkable efficiency built into the white ceramic test tube/sensing instrument by the student collective of the Institute of Electrochemistry of the Ural Scientific Center of the Academy of Sciences of the USSR and a number of Sverdlovsk scientific-investigative institutes. A miniature oxygen sensor coupled to other instruments can provide information about both the gaseous atmosphere of a metallurgical oven, and how coal or oil burns in boilers of TEIs'. The new sensor not only is a "controller" but a "regulator" as well. If, during heat treatment in a metallurgical oven, an excess of oxygen occurs and one of the heat tubes burns through, the combustion products fall into the device and the test-tube immediately "sounds the alarm." It can also tell exactly where the error has occurred, and thus is able to maintain the prescribed composition of the oven's atmosphere. Sensors made of solid electrolyte already keep watch in the Cherpovetskiy Steel-Rolling Plant, eliminating defects, the causes of which were breakdowns in the gaseous atmosphere in the ovens. There are experimental sensors also in the Chelyabinskij Tube-Rolling Plant, and the Sinarskiy Pipe Plant. They have been tested in the Sredneural'skiy, and Reftinskiy plants, and in other Ural industries. And recently, the tiny "sentries" have begun to interest motorists. Initial testing demonstrated the content of harmful exhaust emissions. Sensors with solid electrolyte may also find application in the electronics industry, medicine, and agriculture. The student-chemists dedicated their innovative efforts to the 62nd anniversary of the Great October socialist revolution and to the 110th anniversary of the birth of V. I. Lenin. [Text] [Moscow IZVESTIYA in Russian 1 Nov 79 p 1] 9481

AIRBORNE INSTALLATION--Aviators of Eastern Siberia helped in significantly speeding up work by electric power workers installing LEP-220 [electric transmission power lines] from Ust'-Ilimskaya GES to Severomuyskiy Tunnel--the largest on the BAM [Baykal-Amur Railroad Line]. The use of helicopters only on the stringing of conduits allowed a reduction in the time of the operation from an hour to 12 minutes. In the north of Buryatiya, the electric power lines were strung along steep slopes of heavily wooded mountains. Swamps and numerous rivers hinder work. Under such conditions the usual methods are not always effective, and aviation comes to the aid of construction workers. Helicopters fly support towers to the route and help install them. The collaboration of the pilots and the workers guarantees that before the end of the year, the LEP will stretch to the western portal of Severomuyskiy Tunnel. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 21 Nov 79 p 2] 9481

HYDROELECTRIC STATION IN TADZHIKSTAN--On the banks of the Vakhsha construction has begun on the Baypazinskaya GES--the sixth station in the Vakhshskiy system. The four units of the new GES will have a fixed capacity of 600,000 kilowatts. They will deliver additional power native agriculture of the Central Asia republic. Outfitting of the Baypazinskaya GES will be completed in the 11th Five-Year Plan. [Text] [Moscow IZVESTIYA in Russian 11 Dec 79 p 2] 9481

NEW PRESSURE FORGE--In the new pressure forging shop of the association, "Izhorskij Zavod", the installation of a unique pressure forge having a force of 6,000 tons is being carried out. "Equipped with the last word in engineering," says the chief engineer of the project, N. Monakhov, "New production is based on the output of heavy forgings of up to 200 tons from high-alloy grades of steel which are essential for the atomic power industry. All operations here will be carried out in automation. [Text] [Moscow IZVESTIYA in Russian 21 Nov 79 p 3]

GIANT TRANSFORMER--In the industrial association, "Zaporozhtransformator" imeni V. I. Lenin, assembly has begun on a transformer with a capacity of one million kilovolt/ampères. The transformer is intended for the Pyazanskaya GRES. The overall economic effect of its use will exceed 350,000 rubles. [Text] [Moscow IZVESTIYA in Russian 13 Sep 79 p 1] 9481

NEW RIGA TETS -- Riga -- A new light flashed yesterday on the control board of the integrated dispatching control of the power systems of the northwest USSR: the last and fourth turbine unit of the Riga TETs-2 was delivered for operation. Now, the capacity of this heat and electric power station has reached 400,000 kilowatts. The new TETs will supply heat to the majority of the industrial enterprises, cultural and domestic services, and new residential blocks of the Latvian capital. [Text] [Moscow TRUD in Russian 19 Dec 79 p 1] 10,233

ATOMMASH PLANT -- Response by M. Neuymin, Deputy Minister of Power Machine Building -- In the article "Silence in Response" published in the newspaper "SOTSIALISTICHESKAYA INDUSTRIYA" of 15 Nov 79, it was mentioned correctly that the production association "Izhorskiy zavod" imeni A. A. Zhdanov delayed the deliveries of blanks to the production association "Atommash" for the first set of the AES building equipment. The problem of fulfilling the deliveries of blanks for the production association "Atommash" was examined by the board of the ministry. The production association "Izhorskiy zavod" imeni A. A. Zhdanov was instructed to complete the deliveries of the blanks in 1979 and in the first quarter of 1980. Control was established over the deliveries of blanks to the production association "Atommash". [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 8 Dec 79 p 2] 10,233

NIZHNEKAMSKAYA GES -- The builders of the Nizhnekamskaya GES fulfilled their socialist pledges and completed the installation of the second unit by the Power Engineer's Day. The station will reach its design capacity in 1983. In the meantime, installation work is progressing in full swing on the next four units. They must start operating next year. [Text] [Moscow STROITEL'-NAYA GAZETA in Russian 21 Dec 79 p 3] 10,233

60: 1822

## ENERGY CONSERVATION

### FUEL, POWER SUPPLIES IN GEORGIA CAUSE CONCERN

#### Electricity Conservation Measures Needed

Tbilisi ZARYA VOSTOKA in Russian 6 Dec 79 p 2

[Article by Sh. Kvaskhvadze, chief engineer of Energosbyt, Georgian Main Power Administration, under rubric "Conservation--Management Discipline": "The Overall Picture and the Particularities"]

[Text] To ensure precise, uninterrupted supply of fuel, electricity, and heat to the national economy and the population during the difficult winter period and to make rational use of energy resources--these are the tasks facing the republic's power engineering workers today. The November CPSU CC Plenum focused substantial attention on this problem. Such an approach must be made the cornerstone of all management activity not only in enterprises and organizations making up Gruzglavenergo [Main Georgian Power Administration] but also all other ministries and departments.

It is easy to see why such attention was focused on this problem: Too many losses result from every instance of interruption in energy supplies--last winter demonstrated this with utmost clarity. But we are focusing attention on something else: Energy resources are not unlimited, so they must be utilized thriftily. Our executives already have a certain amount of experience in this regard. There are many collectives in the republic which annually save tens and hundreds of thousands of kilowatt hours of electricity and large amounts of other energy resources. These include the Kutaisi Motor Vehicle Plant, the Tbilisi Knitwear Production Association, the Aviation Plant imeni Dimitrov, and the Tbilisi subway. And in the republic as a whole, more and more attention is being focused on strict compliance with norms of energy consumption and the use specifications. Socialist competition is spreading for electricity and fuel conservation. These efforts are yielding excellent results. In the first half of this year Georgia's industry conserved 88 million kilowatt hours of electricity and 100,000 gigacalories of standard fuel.

This is the overall picture. An analysis of the particulars, however, has shown that some ministries, departments, enterprises, and associations are still consuming too much electricity. They have not accommodated themselves to quotas and norms of electricity consumption. During that same period, about 200 of our enterprises subordinate to 39 ministries and departments consumed above-quota amounts of no more and no less than 5.8 million kilowatt hours of electricity.

We have not confined ourselves to merely recording violations in energy utilization. We have attempted to categorize mistakes and oversights leading to serious losses of energy resources. It has been necessary to pinpoint the "critical factors" and bring them to the attention of executives. We have had to define precisely the main thrust of efforts to impose strict order in compliance with norms.

Let's start from the beginning. One of the key conditions in successful efforts to conserve energy resources is the introduction of scientifically substantiated norms of consumption on the production of each type of product. Nobody today needs to be convinced of the correctness of this approach. But it is necessary to remind them, because in many places people are not focusing the necessary attention on the matter. In many of our enterprises the present system of monitoring electricity consumption does not guarantee efficient control over compliance with stipulated norms. We frequently encounter a situation in which there are energy resource consumption norms in the enterprise as a whole, yet on the production shop and section levels there is complete ignorance as to how much electricity should be used to produce a particular item. And there is another extremely widespread shortcoming--frequently the specific norms themselves are inflated, and an enterprise which is actually wasting considerable energy will smugly report on its conservation successes. It may be that a particular collective benefits from this imaginary conservation, but every success must be matched against the interests of the state. And the state does not need this kind of paraded figures. One would think this is a simple truth, yet people need to be reminded.

Recently the republic's Energy Inspectorate made a thorough analysis of energy consumption in the industrial enterprises. It was found that although today most of the enterprises are covered by electricity consumption norms many of them are violating regulations in the planning of energy consumption per production output. The periodicity of review of energy consumption norms also leaves much to be desired, as well as the level of economic incentives for collectives of enterprises and organizations of the republic to achieve the best results in making rational use of electricity. The workers of Energosbyt have issued a number of recommendations and suggestions in this regard, yet many of our executives for some reason are in no hurry to apply them. Yet our recommendations point to specific reserves which will make it possible to "put to work" or prevent losses of more than one million kilowatt hours of electricity and more than 80,000 gigacalories of heat. In most cases, taking

this step requires practically no material outlays. All it takes is better organization, higher responsibility, more exactingness with regard to this vital effort. Yet it is these qualities that are in short supply at such major enterprises as the Shorapani Elektroelement Plant (which in just the first six months of this year overconsumed hundreds of thousands of kilowatt hours), the Zestafoni Ferroalloy Plant, the Bzyb' Woodworking Combine, the Tbilisi Bread Products Combine, and so on. Energosbyt inspectors have repeatedly drawn to the attention of enterprise officials the necessity of undertaking decisive steps in the matter of energy use, yet no specific steps have been undertaken. This attitude toward energy consumption must be broken. ". . . However rapidly we develop power," said Comrade L. I. Brezhnev at the November CPSU CC Plenum, "heat and energy conservation will continue to be a matter vital to the state." To be guided in everyday efforts by this directive is the duty and direct responsibility of every official.

And another point. The experience of past years has shown that many of the republic's enterprises, construction organizations, and agricultural enterprises are using electric heaters to heat facilities. This might seem to be a trivial, petty matter--after all, what's one electric heater compared with a modern machine tool using huge amounts of electricity every day? Well, our service has some strong figures regarding this. However, we do not wish to overload this article with statistics. We will merely say that the operation of these "innocent" electric heaters during peak hours substantially increases the strain on the republic's power system. Yet the people in many of our plants, construction projects, and farms blithely omit these from their calculations. After all, what could be easier: You just plug in a big heater and all your heating problems are solved, no need to break your neck installing a conventional steam heat system, which requires constant maintenance. But this is too high a price to pay for elementary mismanagement, for the inability to impose order in production. There is hope, by the way, that in the forthcoming cold season Energosbyt inspectors will encounter fewer such instances. They have been given strict directives to focus special attention on the use of electric heaters and, when they encounter such instances, to impose fines on the responsible parties for wasteful consumption of energy.

Winter is at hand. What will it be like? Mild? Severe? Only the weather forecasters can answer. One thing, however, is certain: The forthcoming winter season will be difficult. And to avoid repetition of last winter's situation, when enterprises experienced difficulties in electricity supply, we must take specific measures now to impose order in energy management.

## Expanded Session on Fuel, Power

Tbilisi ZARYA VOSTOKA in Russian 9 Dec 79 p 1

[Gruzinform report under rubric "In the Georgian Communist Party Central Committee": "Strict Monitoring of Fuel and Energy"]

[Text] An expanded conference on fuel and energy problems was held in the GCP CC. Invited to the meeting were republic party, soviet, trade union and Komsomol officials, workers of the GSSR People's Control Committee, members of the Republic Council for the Conservation of Metal, Cement, Timber, Fuel and Electricity, and analogous councils in the autonomous republics, the autonomous oblasts, cities, and rayons, officials of ministries, departments, the Transcaucasian Railroad, major enterprises, associations, secretaries of party committees, party organizations, and workers of the press, radio, and television.

GCP CC Secretary Z. A. Chkheidze gave a report "Measures for Further Improvement of the Work of the Enterprises and Organizations of the Republic's Fuel Sectors, Strict Conservation of Fuel and Energy Resources, and Strengthened Party Supervision of Production in Accordance with the Requirements of the CPSU CC as Expressed at the Conference on Fuel and Energy Problems, and Tasks with Regard to Resolving Energy Problems in Light of the Statements and Conclusions Contained in the Speech of Comrade L. I. Brezhnev at the November 1979 CPSU CC Plenum."

Ideas concerning the basic directions of handling the problem were shared by Abkhazian Obkom Second Secretary V. I. Alavidze, Tbilisi Gorkom Secretary B. D. Makharashvili, Gruzneft' Production Association General Director R. N. Tevzadze, Adzharian Obkom Industrial-Transport Department Chief L. M. Goliadze, Gruzugol' Production Association General Director V. F. Gvindzhilia, Transcaucasian Railroad Administration Chief L. G. Vardosanidze, Georgian Main Gas Administration Chief B. F. Lobzhanidze, GSSR Housing and Communal Services Minister N. G. Vashadze, Gruzglavenergo [Georgian Main Power Administration] Chief Yu. Ye. Chediya, Tkibuli Gorkom First Secretary G. S. Pkhakadze, Kutaisi Gorkom Second Secretary V. A. Khazardze, Rustavi Soviet of People's Deputies Executive Committee Chairman A. Ye. Ubiraya.

It was noted that the analysis of key problems in Comrade L. I. Brezhnev's speech at the CPSU CC Plenum focused special attention on fuel and energy problems and set forth new tasks with regard to the whole complex of energy problems. Prior to the plenum the CPSU CC held a meeting to discuss the tasks of party and economic organs in light of the statements of Comrade L. I. Brezhnev with regard to problems of developing the country's fuel and energy complex.

Problems of raising production effectiveness, seeking out and making use of reserves, and conserving fuel and energy are constantly at the focus of attention of the GCP CC, local party committees, and soviet and economic bodies. These efforts are yielding results. According to the Central Statistical Administration, in the first nine months of this year the republic conserved 33,900 tons of boiler and furnace fuel (in terms of standard fuel), 165,900 gigacalories of heat, and 102.8 million kilo-watt hours of electricity.

While noting these figures, participants said, we must at the same time take account of the vital necessity of sharply improving our efforts with regard to the whole energy problem.

The critical remarks and suggestions expressed at the CPSU CC conference with regard to improving the efforts of enterprises and organizations of the fuel sectors and the party supervision of production apply completely to the activities of the republic's collectives.

At the GCP CC meeting, just criticism was addressed to Gruzugol' Production Association, which is lagging behind all-union indicators. Rates of mining output are too low. Because of the slow pace of construction, production facilities that have gone out of operation are not being replaced fast enough and new ones are not being put into operation. Material-technical and workers' supply services are not performing satisfactorily, they are not manifesting the necessary concern for people.

Despite considerable success achieved by Gruznegt', there are a number of problems requiring urgent handling. The quality of drilling operations is not up to today's requirements. There have been cases of exploratory and operational drilling plans not being fulfilled. Another cause for concern is the problem of storing and transporting ever-increasing volumes of petroleum products. Still to be put into operation is the tank park at the head facility in Samgori, the construction of which is among the most vital projects.

Suggestions to improve product quality were addressed to the Kutaisi Electromechanical Plant and the Rustavi Metallurgy Plant, which make equipment and pipes for the oil industry.

Participants in the meeting noted that in the first nine months of this year the republic had assimilated all inventories [fondy] with respect to the basic types of oil products, yet the situation sharply deteriorated in November. Now the collective of Gruzneftesnabsbyt [Georgian Main Administration for the Supply and Sale of Petroleum Products] will have to be more precise and efficient in handling problems of supplying the national economy with oil products. Much also depends on rail and automotive transport workers, who are responsible for ensuring uninterrupted shipments of fuel.

Participants stressed the fact that uninterrupted supplies of fuel for the republic's economy and population will require not only successful completion of production plans but also strict compliance with state planning discipline in the utilization of fuel and energy. All ministries, departments, enterprises, and organizations must review efforts with respect to conserving and making rational use of fuel as one of their most important tasks.

Meanwhile, in efforts to conserve fuel and energy resources, the republic is not making full use of its possibilities. Some ministries, departments, industrial, construction, and transport enterprises, kolkhozes and sovkhozes, and communal-service establishments are not taking the necessary steps to impose state order in the use of fuel and energy resources; they are permitting inefficient consumption and failing to comply with stipulated norms and quotas in the consumption of fuel, heat, and electricity.

Of special concern is the poor state of fuel and energy resource monitoring.

Participants also noted that the economy and the republic's energy balance are badly hurt by electricity losses in the Gruzglavnenergo networks. There are still major shortcomings in the consumption of fuel, energy, and lubricating materials on the kolkhozes, departments of the Georgian Sel'khoztekhnika, and automotive transport enterprises.

Despite the fact that in the republic as a whole targets with respect to reducing electricity consumption have been met, some enterprises and organizations are still consuming too much. The situation is especially unsatisfactory in the Ministry of Agriculture, the Ministry of Food Industry, and Tsekavshiri [Tsentrinosoyuz].

Meeting participants also noted that the officials of a number of enterprises and organizations are still underestimating the importance of building up stocks of reserve fuel in case of interrupted gas supplies.

The problem of conservation of natural gas is an especially urgent one in the republic.

In addition to eliminating gas losses in industrial enterprises, much more remains to be done. There are still many small-scale, low-efficiency boiler facilities in the republic that are not equipped with instruments for automatic regulation of processes. This results in 5 to 10 percent overconsumption of gas. A rather big conservation reserve is the fuller utilization of secondary energy resources.

Special attention must be focused on heating and the reduction of heat losses in residential and public buildings, and so on.

Taking account of last winter's lessons, much has been done to ensure uninterrupted gas supplies in the republic. But consumers must also strictly comply with daily quotas and take timely steps to replace stocks of reserve fuel.

Considering the present strained state of the republic's fuel and energy balance, the use of renewable types of energy could do a great deal to improve industrial, agricultural, and communal heating in certain rayons of the republic, including mountainous areas that lack their own fuel resources. Participants in the meeting discussed the use of geothermal energy in the republic's economy, as well as solar energy for heating purposes.

The republic's scientific forces must be enlisted more broadly in resolving problems of utilizing secondary energy resources as well as possibilities of replacing some of them with other types.

The meeting focused considerable attention on the development of water power. It was noted that our republic is extraordinarily endowed with water power resources. Considering this, one of our most vital tasks is to develop water power resources as quickly and completely as possible. It was noted, however, that any one-sided orientation or preference toward water power could not fully resolve all problems of providing a reliable supply of electricity in the economy. Unquestionably, however, problems of developing the republic's energy base require urgent handling.

It is necessary to continue to focus unflagging attention on the overall development and conservation of fuel and energy resources, to seek out and utilize production reserves, and to enlist party and Komsomol members and all the working people of the republic in this vital matter. For this reason, finding ways to conserve fuel and energy and use them rationally remains an urgent task in all links of the national economy. All efforts to resolve energy problems must go on every day.

Obkoms, gorkoms, and raykoms are urged to step up mass-political and organizational efforts among the collectives of enterprises and organizations, especially those in the fuel sectors, and to impose higher demands on economic executives. These problems must always be at the focus of attention of the obkoms, gorkoms, and raykoms. It is necessary to improve the quality of cadre work. One of the most important tasks of the obkoms, gorkoms, and raykoms is to retain cadres in the fuel production organizations, especially the coal industry. In resolving this task, one vital factor is that of further improving working and living conditions for workers in the fuel sectors.

The mass media--the press, television, and radio--must broadly publicize problems of rational and efficient utilization of fuel and energy resources and progress in socialist competition; they must generalize and

popularize advanced experience and produce regular thematic broadcasts. Newspapers and journals must publish articles and letters under special rubrics, also speeches by production leaders and innovators, engineers, technicians, and scientists concerning efforts to resolve this problem.

Problems of conservation must occupy a special place in the system of upgrading cadre qualifications, in the system of political and economic education; they must be taken account of in mentorship practice and mass-political work among the population.

Participants in the conference expressed confidence that party and economic officials would respond positively to the directives of the CPSU and Comrade L. I. Brezhnev personally with regard to fuel and energy problems and do everything necessary to successfully complete the plans and targets of 1979 and the five-year plan as a whole, providing a worthy greeting for the 110th anniversary of the birth of V. I. Lenin.

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## FUELS AND RELATED EQUIPMENT

### KUYBYSHEV OIL WORKERS AND TRANSPORTATION PROBLEMS

Moscow IZVESTIYA in Russian 30 Oct 79 p 2

Article by E. Kondratov, Izvestiya special correspondent:  
"Cost Accounting As A Basis"

Text The decree of the CPSU Central Committee and the USSR Council of Ministers regarding the improvement of planning and perfecting the management mechanism establishes as one of the main tasks that of rationally using production resources, to include material, labor and financial, to reinforce economizing regimens, and to eliminate losses in the national economy. The Kuybyshev oil workers have assimilated useful know-how in the comprehensive resolution of this problem.

We are enroute to Neftegorsk, a small city in the Transvolga steppe. Its life is strongly bound with oil and the opening and development of the Kuleshovsk and adjacent deposits. Year after year the volume of operations increases here, as does labor intensity. The oil extraction workers have established the following task for themselves: to make the development and processing of oil reserves more efficient, and to reduce the cost of every ton of fuel extracted.

More than 1,300 drivers, tractor operators, bulldozer operators, crane operators, repairmen, and other workers work in the Neftegorsk Industrial Transportation Administration (UTT). To a great extent, the success of exploration, drilling and oil extraction depends upon the precision of UTT operations. Until recently, the drillers and extractors had significant overexpenditures of funds for transportation requirements--more than a half-million overtime hours were worked a year, often there were conflicts between the tractor operators and

customers. Managers from the "Kuybyshevneft'" administration tried to efficiently allocate equipment for specific projects, to limit the customers to a certain quantity of equipment and working time; and a re-deployment of transportation was carried out from region to region. There was no shortage of administrative action programs.

However, the situation did not change significantly. The action group, established in "Kuybyshevneft'", headed by the chief, planning-economic department, N. Larin, undertook a study of the economic efficiency of contracts between the transportation workers and the customers, of all elements of the management mechanism, and examined the cost of operations, planning work-orders, and routing sheets. Why is the current organizational system working poorly?

Before exploring the interrelationships at the "transportation personnel--customers", the initiating group analyzed the operations of the UTT itself. Optimality of routes and the observance of shift duty busses schedules were checked. An analysis was made of the equipment engaged in fuel delivery, of spare parts, and of construction materials. Based upon an exact calculation, strict limitations were imposed upon equipment used by the services. Calculations were made for number and types of vehicles required for a given type of work, and it was established who specifically was authorized to direct the equipment. If previously virtually any machine operator could pick up any vehicle or tractor, now the chief engineer, the chief of production, and operations chief have only "their own" equipment at their disposal, and are individually responsible for economical utilization of that equipment.

Such a procedure has proven effective. Now no one attempts to "hold for ones own use", and the relationships within the collective have changed. During the first year only under the new procedure, a savings of 330,000 rubles was achieved.

It was now possible to turn to the resolution of the main task--improving the entire customer-service system. Before, the drillers had issued a request--40 motor vehicles, three cranes, and 12 tractors are required for tomorrow; the UTT fulfilled the request either fully or partially, depending on its capabilities to do so. After all, there were many customers, and all needed machinery. It is understandable that every customer tried to "grab" more equipment--the continual shortage of transport had taught them to request "with a reserve", i.e., more than they actually required.

The accounting system for driver labor was poorly set up. On an average, for each of the 500-600 operating vehicles, two goods-transportation bills of lading were issued in addition to an itinerary sheet. More than 1,500 of these documents passed through several levels daily. The completed itinerary sheets determined the drivers' wages as well as the amount of work they accomplished. Inasmuch, however, as there was no exact determination made as to which of the customers was specifically to sign the drivers' trip tickets, it was difficult to determine whether or not the tractor had operated a total of 10 hours, or whether a generous customer had "fed" the tractor operator, indicating excess hours. And no one at the UTT ever checked: why? The more on paper, the better.

Such a system engendered "padding" and downtime for machinery, and reduced the responsibility of the transportation personnel, who always had the opportunity to "grab the customer by the neck". Should it come as a surprise that the oil workers had huge cost overruns for transport. After involving economists from the interested enterprises in the operation, the initiating group radically altered the entire procedure used by the transportation personnel to accomplish requested work. The drillers, oil extraction personnel, and construction workers had to plan their transportation requirements with an indication of equipment type and number, and of economically justified volumes of operations. Approximately 70 types of work were established, and everything fell into place. Now the customer entered two words on the bill of lading--"task completed". There was no need to calculate anything, as it was known how much the work costed. Even if the customer wanted to give the driver an hour overtime, it was simply impossible for him to do so. From another standpoint, it would be a disadvantage for the driver to shirk, inasmuch as he is credited only with a completed job.

The paper avalanche abated. In place of thousands of trip tickets, a table was instituted which indicated the type of machine, type of work, and its cost. The driver presented a bill of lading with a note--a single figure is required: everything by type, collate, and add. Inter calculations became more convenient and simpler.

Delving into the depths of the management mechanism itself, and an understanding of the economic essence of concepts such as limits, norms, cost, and labor productivity gradually trained the workers in searching for reserves, and created conditions for the transition of transport to the contract method. An experiment was conducted in transporting drilling brigade property--a specific, costly, and wastefull operation.

Earlier, the move had been a matter involving the drillers themselves. They issued a request for transportation, then loaded the sheds, kitchens, power and other equipment themselves and transported all this property to another drilling area, at times many kilometers away. The operation they used was expensive, and required 5 to 7 days.

Now the drillers issue the request, what and where is to be transported. The rest is up to the transportation personnel. The first to be moved was the brigade of Hero of Socialist Labor N. Mochal'nikov. It was accomplished in a day. Next was the brigade of V. Shevel'. "You'll lunch at the old drilling site, and have supper at the new one", promised the experiment participants. That is exactly how it happened. Even a crane break-down did not interfere in the completion of the job on time.

Currently the move of brigade property requires from 1 to 3 days. Cost of the entire operation runs from 380 to 1,700 rubles. Is such a contract advantageous to the transport personnel? Of course it is. The equipment is being freed 3-4 days earlier for other operations.

Opportunities are being sought to eliminate return "deadhead" runs--move itineraries for drillers, derrick erectors, and repair personnel have been coordinated. The contract method has been extended to support excavations, land reclamation, and the delivery of fuel and water to the wells. The customer now has no need to inquire as to whether and what sort the UTT has in the way of machinery. He knows that the UTT is vitally interested in serving him rapidly and with high quality. Everyone in the transportation brigade knows exactly how much the contract work they perform costs, as it is all calculated in advance.

The task now is to establish pipe delivery, drilling units delivery, and other operations on the contract arrangement. New methods are now being developed. Programs to improve the management and economic levers which have been implemented have practically eliminated "padding" connected with "overtime". During the very first year, the number of overtime hours has been almost halved, while the output per freight vehicle grew 24 percent. Expenditures for transportation services in the drilling sector were reduced by 850,000 rubles, and by 650,000 in the extraction sector. Planning based upon scrupulous calculation, an exact knowledge of goals, and optimum provision for operations engenders a confidence that success will be achieved in people, and reduces fortuitous factors to a minimum.

The experiment to improve the management mechanism which was conducted in Neftegorsk, is now being expanded to all sub-elements of the "Kuybyshevneft'" association--Otryadnyy, Sernovodsk, and Pokhvistnevo. The creative search of the economists, which has been underway now for several years, is aiding the workers to attain stable, high yeild and recovery rates. The experience of the Kuybyshev oil workers has demonstrated the vast reserves each step in the improvement of the management mechanism conceals.

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## FUELS AND RELATED EQUIPMENT

### REPLY TO CRITICISM OVER COAL-MINE SHORTCOMINGS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 7 Oct 79 p 2

Article by B. Belyy, First Deputy Minister, USSR Ministry of the Coal Industry: "Socialist Industry Responds"

Text The article "Optional Solutions" published in the 4 August 1979 issue of SOTSIALISTICHESKAYA INDUSTRIYA which criticized shortcomings permitted during the remodeling of the shaft imeni V.I. Lenin of the "Karaganda-ugol'" association, has been reviewed with a visit of specialists to the scene. The events outlined in the article did take place, as confirmed by the investigation.

Many solutions adopted to ready the second sequence of enterprises were not expeditiously carried out by management of the "Karagandashakhtstroy", the mine imeni V.I. Lenin, and the "Karagandaugol'" association, for which they were severely reprimanded. After the publication of the article, additional measures were developed to improve the progress of the remodeling, which will allow a new breakage (face) to be placed into operation in the first quarter of 1980, and during the fourth quarter of the current year to provide for the equipping of a vertical column and to begin work on the drilling of airways and the improvement of shaft ventilation.

The USSR Ministry of the Coal Industry envisages for 1980 the introduction into operation at the mine imeni V.I. Lenin of addtional capacities with an annual output of 300,000 tons of coal. As a result, the rated index will be brought to 3 million tons of fuel annually.

The USSR Ministry of the Coal Industry has established a continuous oversight program over the implementation of the programs outlined.

## FUELS AND RELATED EQUIPMENT

### BRIEFS

NEW DESIGN DRILL BITS--The Northern Caucasus Scientific-Research and Planning Institute of the Oil Industry (city of Groznyy) has developed a series of new-design drill bits for drilling deep wells under varying geological conditions. The use of these bits will provide a two to threefold increase in the drilling speed for such wells. Text Moscow  
SOTSIALISTICHESKAYA INDUSTRIYA in Russian 30 Aug 79 p 47 8851

KEY PROJECTS--Avdeyevka, Donetskaya Oblast--The newest plant in the Donbass, the Avdeyevka Plant imeni the Fiftieth Year of the USSR has become the largest by-product coke industrial enterprise. Here a battery of coke ovens with a capacity of million tons per year has been placed in operation. Accepting the tradition of participants in key construction, the personnel of the operations sector have given their word that the capacities of the "million-unit" will be on line by 22 April 1980, and not in 6 months, as was provided for by normative deadlines. Text Moscow TRUD in Russian 1 Jan 80 p 17 8851

MINE RENNOVATION--Vladivostok--The modernization of the "Primorskugol'" association enterprises is equal to the introduction of a major mine into operation. Rennovation of the mine increased the extraction of coal by 3 million tons. Association specialists, in conjunction with scientists, outlined further plans for growth in fuel extraction. Comprehensive renovation of the mine will continue, and the development of perspective deposits will be accelerated. Text Moscow TRUD in Russian 13 Dec 1979 p 17 8851

OUTSTRIPPING THE SCHEDULE--Orenburg--The collective from the "Orenburggazprom" all-union association has shipped 2 billion 600 million cubic meters of gas and more than 25,000 tons of elementary sulphur above plan requirements to consumers during the current year. Collectives from all sub elements are competing for a worthy greeting for the Great October Holiday, and are searching for additional reserves to increase the extraction and refining the "blue fuel". Ahead is the first shop for cleaning the product of sulphuric compounds from the gas refining facility, which has reported now fulfilling ahead of schedule the fourth year plan of the five year period. "Orenburggazprom" is now 20 days ahead of the production schedule. Text Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 12 Oct 79 p 17 8851

OIL ABOVE PLAN--Nizhnevartovsk--The collective of the Var'egansk Oil-Gas Extraction Administration has extracted 40,000 tons of fuel above plan since the beginning of the year. This is one of the newest sub elements in the Glavtyumen'neftegaz system. It extracts the "black gold" from new deposits located north of the renowned Samotlor. Employing progressive methods and widely implementing advanced labor practices, the administration collective increases the extraction of above plan liquid fuel with the passing of each day. In addition to the task, the Var'eganskites are now extracting approximately 800 tons of oil daily from underground stores. The collective is confidently leading among the oil extractors of the Nizhnevartovsk region. Text Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 12 Oct 79 p 17

AIR MOVES DRILLING RIGS--Neftekamsk--Even with the drilling of wells using the multiple method, the drilling rig must be moved several meters to the next point by powerful tractors and dollies. This labor intensive operation usually requires 5-6 hours on the part of the derrick installers. The Neftekamsk Administration for Drilling Operations has established a new method for moving the rigs: here they have decided to replace the tractors and the dollies with air. For this, they inflate ten rubber tires and create a powerful lateral pressure. Using this, the rig moves in the desired direction along an incline. Just such an operation was recently performed by the derrick installation brigade of M. Suleymanov. It required only 45 minutes in all. Text Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 12 Oct 79 p 27 8851

HIGH PROGRESS RATES--Tyumen'--The first several hundred meters of gas pipeline have been laid which will connect the Urengoy deposit with the system of operating pipelines. The USSR State Prize Laureate brigade (welding-installation) of B. Diduk has established its goal as completing the 380 kilometer line two months ahead of the deadline. Text Moscow  
IZVESTIYA in Russian 13 Nov 79 p 17 8851

A STEP BEYOND THE KAMA--Perm', 2 Nov--The builders of the Surgut-Polotsk refinery have achieved an important victory--they have completed the laying of a siphon across the Kama River. Overcoming a water barrier on the route of Siberian oil to the country's central regions was not a simple undertaking. For this, it was necessary to dig a trench along the river bottom, and then lay 2 kilometers, 800 meters of welded pipe. Text Moscow PRAVDA in Russian 3 Nov 79 p 1, V. Cherepanov, correspondent 8851

REDUCED GAS DELIVERY COSTS--Yalta, Crimean Oblast--Transportation expenditures are being lowered for the delivery of natural gas by the Bakhchisaray-Yalta new pipeline to the area of the All-Union Sanatorium. Yesterday the final joint of the steel artery was welded, which connects the resort with the Ukraine South-Crimea main pipeline. The first cubic meters of gas are already flowing along the line. Text Moscow TRUD in Russian 4 Nov 79 p 17 8851

FOR UNDERGROUND STORES--Tashkent--The "Uzbekneftegazgeologiya" geological production association collective has attained a labor success in prospecting oil and gas. "The plan for the growth of industrial gas reserves was fulfilled by 110 percent" related K. Khakkulov, the general director of the association. "We opened the new Sardob gas condensate deposit. This year we have already transferred two deposits to the gas extraction industry. Our best expeditions--Predgissarskaya, Aladskaya, and Mubarekskaya are leading in socialist competition. The outstanding brigades of foremen Kh. Temirov, S. Karimov, A. Tilavov, and E. Khikmatov have fulfilled the plan task for the current year ahead of schedule. Text Moscow  
IZVESTIYA in Russian 12 Nov 79 p 17 8851

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